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ABSTRACT

One of the major problems in measuring community mental health status is the lack of consensus among mental health workers in psychiatry, psychology, sociology, and epidemiology as to what constitutes mental illness. Additionally, changing social mores preclude a definition of mental illness in behavioral terms. An operational definition of mental illness is proposed that bypasses these difficulties and makes it possible to use data already available as indicators of community mental health problems. This definition uses only the "tangible" evidence of mental illness, i.e., suicides and people institutionalized or receiving ambulatory care for conditions other than physical illness. These statistics are then transformed into indices of community mental illness that are the basis of estimates of mental illness costs. Five states in the United States are compared with respect to mental health status and mental illness costs. Limitations of the indices and cost estimates are discussed. (Author)

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Indices of Community Mental Health. A Proposal

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Indices of Community Mental Health: A Proposal

In 1967 the National Center for Health Statistics, the Federal agency charged with the collection and analysis of health statistics in the United States, sponsored a meeting of experts in the fields of psychiatry, psychology, sociology, epidemiology and biometry to address the problems of defining and measuring mental health. At a loss about the kinds of data to collect for assessing the prevalence of mental illness, the agency asked the experts to make some concrete recommendations to facilitate its work. These recommendations were given in the summary and recommendations section of the proceedings published under the title, The Definition and Measurement of Mental Health.[1] Following a valiant but not too successful attempt to reconcile the widely divergent views of the experts in the various disciplines, the moderator of the meeting recommended that a social effectiveness and disability survey be conducted, along with a screening survey, in which measuring instruments such as the Katz Adjustment Scale,[2] be used. Data to be collected in the soical effectiveness and disability survey are data on physical and social functioning in self-maintenance, and in the family, school, work and community environments.

The lack of a unified theory of mental health or illness, as

evidenced by the various definitions and approaches of the experts at this meeting, makes it difficult for a government agency to collect data in the mental health field. The reduction of a complex phenomenon such as mental illness to social effectiveness and disability does simplify the task of case-finding somewhat once social effectiveness and disability is operationally defined. However, even with this definition the problem of the data standardization remains.

Without some knowledge of the mental health status of the community, it is difficult to assess the effectiveness of mental health programs and the need for such programs. In a compendium on needs assessment[3] compiled for the National Institute of Mental Health, the authors listed five approaches, only one of which is based on objective data: rates under treatment (RUT). RUT is somewhat analogous to the mental disability rate to be operationally defined in this paper. The other approaches involve the collection of field survey data on self-reported health status and service use from the community, the convening of a forum of key informants or community leaders, the solicitation of the opinions of health professionals and officials, and the gathering of socio-demographic data of community residents. The last approach, while objective in nature, is useful only if differences in the use of health services are substantially correlated with socio-demographic differences.

New Index Proposed

In this paper a conceptually and methodologically different approach is presented for measuring the severity of mental health problems that obviates the problem of defining mental illness, variously termed personality disorders, deviant behavior, or psychopathology, depending on the orientations of the one making the definition. This approach is based on observable and reportable behavioral manifestations of mental ill health--suicides and medical treatment or care for ailments that are non-physical. It is immaterial how mental ill health is defined; as long as a person commits suicide or receives care for non-physical conditions or problems either initiated by the individual himself or by society, he is mentally ill (hereafter called mentally disabled). He could be an alcoholic, a substance or child abuser, brain-damaged, mentally retarded, or simply a person who could not cope with life unaided. Criminals who are required by court order to undergo psychiatric treatment are mentally disabled.

There are two advantages to this approach. One is that the data are readily available, at least in the United States. The second is that regardless of the orientations of the mental health specialist, there can be little argument that suicides and institutionalization or home treatment for conditions other than physical

are valid indicators of mental problems. True, some religious sects consider suicides a normal practice, but in most civilized societies suicides are regarded as the outcome of extreme mental distress.

As for institutionalization and home treatment for mental ailments, including psychosomatic disorders, it would not be too difficult to derive a consensus that they reflect the presence of mental problems. It matters little that habitual wife-beating or child abuse may be shrugged off as inconsequential in some community while considered signs of a serious mental problem in another. By this approach if the wife-beater or child abuser is not getting treatment and society does nothing about it, he is not mentally disabled. It is recognized that this approach would exclude many normally considered "mentally sick" people who should be treated. However, to ferret out information about these people, besides being a costly undertaking, would re-inject the issue the mental health specialists have so far failed to resolve: just who is mentally ill.

The index is a function of two components--the number of suicides and the number of mentally disabled. The two indicators of mental ill health are consonant with the objectives of the health component in Terleckyj's monumental work on national goals accounting,[4] which are: (1) long life and (2) life characterized by physical and mental well-being. The indicator for long life is average life expectancy

at birth, which is, of course, affected by the number of suicides along with other deaths, and the indicator for physical and mental well-being, percent of population with disabling conditions, including mental disorders. Since this paper is devoted to the measurement of community mental health, deaths other than suicides and disabling conditions that are purely physical (e.g. crippled) will not be considered.

Rationale and Data Requirements

The formulation of the index is based on the observation by a committee of the World Health Organization that the health of an individual is relative to the norms of a group of which is is a member.[5] This observation can be extended to communities in a society. For instance, a comparison of the mental health status of Calcutta, India, and San Francisco, U.S.A. would be of academic interest only, since little could be done to achieve comparability in mental health status in the two cities. But if San Francisco is compared with Los Angeles in mental health status, it is at least theoretically possible that any difference in mental health status that is found can be wiped out or at least reduced by a re-allocation of mental health resources.

The data required for the index are the number of suicides recorded in a community in a given year of interest, the number of people in the surviving population who are mentally disabled and the mid-year population size of that community. These data are used to compute

two rates as the first step in the computation of the overall index: the suicide rate and the rate of the mentally disabled among the surviving population (hereafter called the mental disability rate). Once the rates for all the communities are computed, the community or communities with the lowest suicide rate and/or the lowest mental disability rate, which represent the achievable rates, are used as the norms relative to which the mental health status of the other communities (called the comparative communities) are assessed. The purpose of the assessment is to detect the distances which the comparative communities have to travel to catch up with the normative communities. Or, arbitrary but reasonable norms in the form of mental health goals may be used. In this case the purpose is to monitor the progress of the comparative communities toward the goals.

Symbolically, let f_{r1} be the number of suicides in the normative community in a given year of interest (or the number of suicides/100,000 population if an arbitrary norm is used), f_{r2} the number of people among the surviving normative population who are mentally disabled (or the number of mentally disabled/100,000 population if an arbitrary norm is used), N_r the mid-year size of the normative population,

f_{c2} the number of mentally disabled among the surviving comparative population, f'_{c1} the number of suicides that would occur in the comparative population if its suicide rate were the same as that of the normative population (called expected number of suicides), f'_{c2} the number of mentally disabled people that would be observed in the comparative population if its mental disability rate were the same as that of the normative population (called expected mentally disabled number), and N the mid-year size of the comparative population.

The suicide rate of the normative population/100,000 is

$$R_{rs} = (f_{r1}/N_r)(100,000) \qquad (1)$$

The mental disability rate of the normative population/100,000 is

$$R_{rm} = \{f_{r2}/(N_r - f_{r1})\}(100,000) \qquad (2)$$

The suicide rate of a comparative community/100,000 is

$$R_{cs} = (f_{c1}/N)(100,000) \qquad (3)$$

The mental disability rate of a comparative community/100,000 is

$$R_{cm} = \{f_{c2}/(N - f_{c1})\}(100,000) \qquad (4)$$

If the norm is from a normative community, the expected number of suicides in a comparative community is

$$f'_{c1} = Nf_{r1}/N_r \qquad (5)$$

If an arbitrary norm is used, the expected number of suicides in a comparative community is

$$f'_{c1} = Nf_{r1}/100,000 \qquad (6)$$

The expected number of mentally disabled in a comparative community, if a normative community is used, is

$$f'_{c2} = (N - f_{c1})f_{r2}/(N_r - f_{r1}) \quad (7)$$

If an arbitrary norm is used, the expected number of mentally disabled in a comparative community is

$$f'_{c2} = (N - f_{c1})f_{r2}/100{,}000 \quad (8)$$

The subindex for suicides is

$$S = f'_{c1}/f_{c1} \quad (9)$$

The subindex for mental disability is

$$M = f'_{c2}/f_{c2} \quad (10)$$

Equations (9) and (10) show that the subindices are two ratios. S is the ratio of the expected number of suicides to the actual or recorded number of suicides in a comparative community. M is the ratio of the expected number of mentally disabled to the actual number of mentally disabled in a comparative community. Although there is no reason why S and M cannot exceed unity, generally they should range between zero for the worst possible case in which the comparative community is way below the norm to unity for the situation in which the comparative community is at par with the norm. This is so because the criterion of selection of the norm is that it is lower than the rates of the comparative communities.

The overall index encompassing both suicides and mental disability is

$$H = \sqrt{SM} = \{(f'_{c1}/\ f_{c1})\ (f'_{c2}/\ f_{c2})\}^{\frac{1}{2}} = (f'_{c1}\ f'_{c2}/f_{c1}\ f_{c2})^{\frac{1}{2}} \qquad (11)$$

Equation (11) says that H is the geometric mean of the two ratios. Implicit in this equation is the assumption that the two subindices are equally important indicators of mental ill health. Some may argue that suicides are a more important indicator of mental illness than mental disability. This argument, if it exists, is probably made on the affective level, such deaths by whatever cause elicit strong emotions. It should be remembered, however, that the indices are measures of severity of mental health problems in a community, and as such they do not take into consideration the emotional aspects of suicides and mental disability.

Computationally and for research purposes, it would be desirable to transform the indices into log form:

$$\ln S = \ln f'_{c1} - \ln f_{c1} \qquad (12)$$

$$\ln M = \ln f'_{c2} - \ln f_{c2} \qquad (13)$$

$$\ln H = (1/2)\ (\ln f'_{c1} + \ln f'_{c2} - \ln f_{c1} - \ln f_{c2}) \qquad (14)$$

The variances of the indices in log form are estimated by

$$\hat{Var}(\ln S) = 1/f'_{c1} + 1/f_{c1} \qquad (15)$$

$$\hat{Var}(\ln M) = 1/f'_{c2} + 1/f_{c2} \quad (16)$$

$$\hat{Var}(\ln H) = (1/4)(1/f'_{c1} + 1/f'_{c2} + 1/f_{c1} + 1/f_{c2}) \quad (17)$$

The variances are useful for establishing confidence intervals of the indices in log form and for testing differences in the indices in log form for statistical significance, assuming normality of the distribution of the index values (and it would be if sample size exceeds 10,000).

The 1976 data for the indices are taken from routine National Center for Health Statistics (NCHS) and National Institute of Mental Health (NIMH) publications. The suicide data are taken from the Vital Statistics Report, published by NCHS and the mental disability data from The Mental Health Statistical Note by NIMH. The mental disability data include only institutionalized patients by state. Although ambulatory care data for mental patients are available from the individual state health departments, NIMH does not routinely collect and publish such data. Since the purpose of this paper is to demonstrate a new approach rather than report a substantive study, no effort is made to obtain the additional data from the individual states involved. The data, including the computed values of the expected numbers of suicides (f'_{c1}) and expected number of mentally disabled (f'_{c2}), are displayed in Table 1.

With the data as displayed in Table 1, the values of the indices and their estimated variances are computed. These values are shown in Table 2.

(Tables 1 & 2 about here)

It is seen from Table 2 that in terms of S, the suicide subindex, New York State is the best among the five comparative states with a value of 0.91, whereas Nevada is the best in terms of the mental disability subindex, M, also with a value of 0.91. When both S and M are considered, Ohio is the best, with an H value of 0.66.

Costs of Mental Illness

In this paper the costs of mental disability and suicides are divided into two categories: (1) disability costs, which include the costs of direct patient care and related patient care activities, the cost of research and personnel training, the cost of facilities development and management, and the cost of time lost due to disability, and (2) suicide costs, which are the discounted projected earnings of productive man-years lost due to premature deaths.[6] This division is arbitrary and is dictated by the composition of the index and by the cost figure breakdowns presented in NIMH publications. It is recognized that other ways of partitioning mental health costs may be more rational.

One could have used cost data available at the state level, but such data are said to be unreliable.[7] The state estimates, therefore, are based on national data, which make it possible to calculate the national per case cost for mental disability and for suicides. Such

estimates, of course, cannot take into consideration regional or state variations in costs. Furthermore, the estimates are based on U.S. dollar figures of 1974,[8] the latest year for which NIMH national cost data are available.

For the disability component, the national per disability case cost for 1974 is $31,843,507,000/603,000=$52,808, where $31,843,000,000 is the total expenditures for caring for the mentally disabled plus the cost of time lost due to disability, and 603,000 is the total number of institutionalized patients. For the suicide component, the national per suicide cost is $4,942,320,000/28,681=$172,320, where $4,942,320,000 is the total of discounted projected earnings of productive years lost due to premature death and 28,681 the total number of suicides.

With the national per case costs for disability and for suicides computed, it is now possible to compute the total and the per capita costs for each of the comparative states. For the total state costs for disability, this is done by multiplying the total number of disabled by the national per disability case cost, and for the total state costs for suicides, by multiplying the total number of suicides by the national per suicide cost. The state per capita cost is computed

by dividing the state total by the size of the population. The results of these computations are displayed in Table 3.

(Table 3 about here)

Limitations and Discussion

One of the most serious limitations of the indices as formulated is that the indices drastically underestimate the severity of the mental health problem of a community because many people who are mentally sick do not commit suicide or receive care and therefore never become statistics for the indices. This limitation cannot be overcome until mental health experts can agree on a definition of mental health or illness that goes beyond the "tangible" evidence of mental illness--suicides and receiving medical care. This definition would enable researchers to collect the necessary data on mental illness.

Another limitation, perhaps just as serious if not more so, is the fact that the number of mentally disabled or f_{cl} may not accurately reflect the degree of need for services. For instance, suppose that in one community all mentally ill patients who desire treatment can receive it, whereas in another community only a small fraction of such patients can receive care. If that is indeed the case, then the number of mentally disabled is more a function of the availability or adequacy of mental health facilities than a function of the number of people needing help. This problem can be

overcome by an examination of the mental health facilities in the communities involved and, if the facilities are found to have waiting lists or rejected care-seekers, an adjustment of f_{cl} to include those on the waiting lists or rejected for service.

The problems with suicide data are well known. First, because of the stigma attached to suicides, many families, with the help of their physicians, report suicides as natural deaths. Further, many attempted but unsuccessful suicides, which also indicate a mental health problem, go unreported. Nonetheless, with all the problems such data have, suicide data provide a valid and perhaps the best evidence of mental health problems in a community.

Finally, the cost figures presented in Table 3 are rough estimates based on cost data that are at best approximations of real costs. This is particularly true of health program development and manpower training costs, which cannot be accurately prorated on an annual basis because the number of years of serviceability cannot be correctly determined. In spite of these difficulties, however, the cost figures do provide health planners with some idea about the economic consequences of mental illness as a rough guide for making decisions on future development of mental health programs.

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7. Personal communication with NIMH data management officer.

8. DHEW, National Institute of Mental Health: Mental health statistical note # 125, 1976.

TABLE 1*

1976 U.S. Suicide and Mental Disability Data
for Mental Health Indices for Selected States

Normative States

State	Pop (N_r)	Suicides (f_{r1})	Rate (R_{rs})	Disabled (f_{r2})	Rate (R_{rm})
Cal.†	21,522,000	3,883	18.0	37,687	175
N.J.††	7,329,000	603	8.2	21,993	300

Comparative States

State	Pop (N)	Suicides (f_{c1})	Rate (R_{cs})	Expec.# (f'_{c1})	Disabled (f_{c2})	Rate (R_{cm})	Expec.# (f'_{c2})
Ohio	10,690,000	1,397	13.1	880	27,277	255.2	18,730
N.Mex.	1,172,000	226	19.3	96	2,309	197.1	2,055
N.Y.	17,924,000	1,625	9.1	1,475	75,012	418.5	31,441
Nev.	613,000	194	31.6	50	1,186	193.5	1,075
W.V.	1,832,000	225	12.3	151	6,872	376.5	3,202

* Data from Vital Statistics Report, Final Mortality Statistics, 1976, NCHS, and Mental Health Statistical Note #144, NIMH, Feb., 1978.

† Lowest mental disability rate.

†† Lowest suicide rate.

TABLE 2

Computed Mental Health Indices & Variances for Selected States Based on Data from Table 1

Comparative States

State	S	lnS	$\hat{Var}$(lnS)	M	lnM	$\hat{Var}$(lnM)	H	lnH	$\hat{Var}$(lnH)
Ohio	0.63	-0.46	0.0019	0.69	-0.37	0.000089	0.66	-0.42	0.00048
N.Mex.	0.42	-0.87	0.0148	0.89	-0.12	0.000920	0.61	-0.49	0.00394
N.Y.	0.91	-0.09	0.0013	0.42	-0.87	0.000045	0.62	-0.48	0.00033
Nev.	0.26	-1.35	0.0252	0.91	-0.09	0.001773	0.48	-0.73	0.00673
W.V.	0.67	-0.40	0.0110	0.47	-0.76	0.000458	0.56	-0.58	0.00288

TABLE 3

Total and Per Capita Mental Illness Costs for 1974*

State	Total Suicide Cost	Per Capita	Total Disability Cost	Per Capita
Ohio	$240,731,040	$ 23	$1,440,443,816	$ 135
N.Mex.	$ 38,944,320	$ 33	$ 121,933,672	$ 104
N.Y.	$280,020,000	$ 16	$3,961,233,696	$ 221
Nev.	$ 33,430,080	$ 55	$ 62,630,288	$ 102
W.V.	$ 38,772,000	$ 21	$ 362,896,576	$ 198

* Data from NIMH Statistical Note # 125, 1976.